

3.3.5.5 Northern Mesic Forest

3.3.5.5.1 Community Overview

Prior to Euro-American settlement, the northern mesic forest covered the largest acreage of any Wisconsin vegetation type. It is still very extensive, but made up of second-growth forests that developed following the Cutover. It forms the matrix for most of the other community types found in northern Wisconsin, and provides habitat for at least some portion of the life cycle of many species. It is found primarily north of the Tension Zone (Figure 2-2), on loamy soils of glacial till plains and moraines deposited by the Wisconsin glaciation. Sugar maple is dominant or co-dominant in most stands. Historically, eastern hemlock was the second most important species, sometimes occurring in nearly pure stands with eastern white pine; both of these conifer species are greatly reduced in today's forests. American beech can be a co-dominant with sugar maple in the counties near Lake Michigan. Other important tree species were yellow birch, basswood, and white ash. The groundlayer varies from sparse and species poor (especially in hemlock stands) with woodferns, blue-bead lily, club-mosses, and Canada mayflower, to lush and species-rich with fine spring ephemeral displays. Historically, Canada yew was an important shrub, but it is now absent from nearly all locations. Historic disturbance regimes were dominantly gap-phase windthrow; large windstorms occurred with long return periods. After old-growth stands were cut, trees such as quaking and bigtoothed aspens, white birch, and red maple became abundant and still are important in many second-growth northern mesic forests. Several distinct associations within this complex warrant recognition as communities, and draft abstracts of these are currently undergoing review.

3.3.5.5.2 Vertebrate Species of Greatest Conservation Need Associated with Northern Mesic Forest

Twenty-three vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with northern mesic forest (Table 3-124).

Table 3-124. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with northern mesic forest communities.

<i>Species Significantly Associated with Northern Mesic Forest</i>
Birds
Northern Goshawk
Least Flycatcher
Black-throated Blue Warbler
Herptiles
Four-toed Salamander
Wood Turtle
Mammals
Northern Flying Squirrel
Woodland Jumping Mouse
Gray Wolf
American Marten
<i>Species Moderately Associated with Northern Mesic Forest</i>
Birds
Red-shouldered Hawk
American Woodcock
Black-billed Cuckoo
Veery
Wood Thrush
Golden-winged Warbler
Canada Warbler
Herptiles
Pickerel Frog
Mammals
Water Shrew
Northern Long-eared Bat
Silver-haired Bat
Eastern Red Bat
Hoary Bat
Moose

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-124 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both northern mesic forest and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of northern mesic forest in each of the Ecological Landscapes (Tables 3-125 and 3-126).
- Using the analysis described above, a species was further selected if it had both a significant association with northern mesic forest and a high probability of occurring in an Ecological

Landscape(s) that represents a major opportunity for protection, restoration and/or management of northern mesic forest. These species are shown in Figure 3-23.

Table 3-125. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with northern mesic forest communities and their association with Ecological Landscapes that support northern mesic forest.

Northern Mesic Forest									
Ecological Landscapes grouped by opportunity for management, protection, and/or restoration of this community type	Birds (3)*			Herptiles (2)		Mammals (4)			
	Northern Goshawk	Least Flycatcher	Black-throated Blue Warbler	Four-toed Salamander	Wood Turtle	Northern Flying Squirrel	Woodland Jumping Mouse	Gray Wolf	American Marten
MAJOR									
Forest Transition									
North Central Forest									
Northern Lake Michigan Coastal									
IMPORTANT									
Central Lake Michigan Coastal									
Central Sand Plains									
Northeast Sands									
Northern Highland									
Northwest Lowlands									
Superior Coastal Plain									
PRESENT (MINOR)									
Central Sand Hills									
Northwest Sands									
Western Coulee and Ridges									
Western Prairie									

Color Key

= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

Color Key

- = HIGH probability the species occurs in this Ecological Landscape
- = MODERATE probability the species occurs in this Ecological Landscape
- = LOW or NO probability the species occurs in this Ecological Landscape

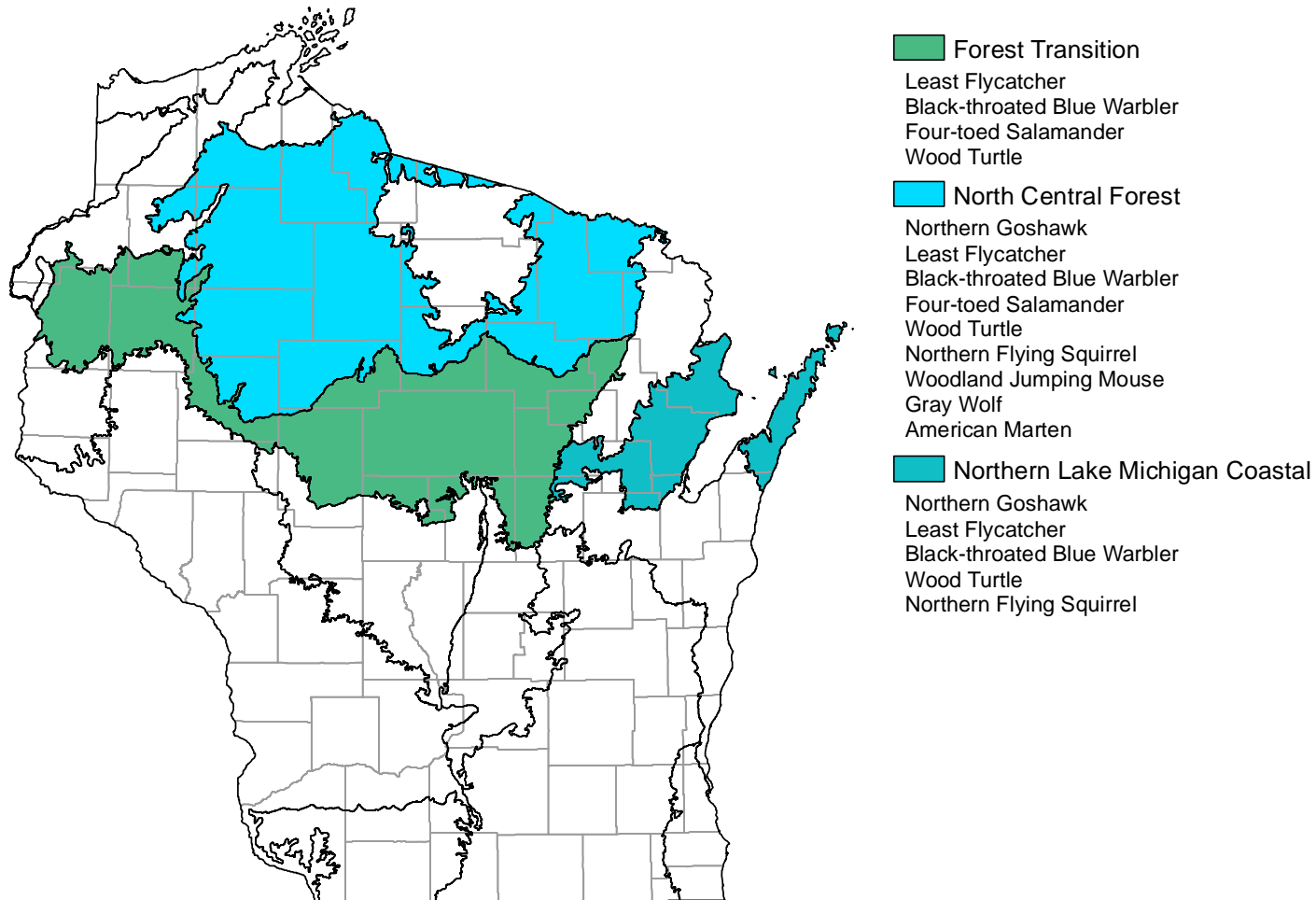
* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Table 3-126. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with northern mesic forest communities and their association with Ecological Landscapes that support northern mesic forest.

Northern Mesic Forest	Birds (7)*							Herptiles (2)		Mammals (5)				
	Red-shouldered Hawk	American Woodcock	Black-billed Cuckoo	Veery	Wood Thrush	Golden-winged Warbler	Canada Warbler	Pickereel Frog	Water Shrew	Northern Long-eared Bat	Silver-haired Bat	Eastern Red Bat	Hoary Bat	Moose
MAJOR														
Forest Transition														
North Central Forest														
Northern Lake Michigan Coastal														
IMPORTANT														
Central Lake Michigan Coastal														
Central Sand Plains														
Northeast Sands														
Northern Highland														
Northwest Lowlands														
Superior Coastal Plain														
PRESENT (MINOR)														
Central Sand Hills														
Northwest Sands														
Western Coulee and Ridges														
Western Prairie														

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Figure 3-27. Vertebrate Species of Greatest Conservation Need that have both a significant association with northern mesic forest and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of northern mesic forest.



3.3.5.5.3 Threats and Priority Conservation Actions for Northern Mesic Forest

3.3.5.5.3.1 Statewide Overview of Threats and Priority Conservation Actions for Northern Mesic Forest

The following list of threats and priority conservation actions were identified for northern mesic forest in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.5.5.3.2 unless otherwise indicated.

Threats and Issues

- Large patches and old forests are underrepresented. Conifers are especially underrepresented in the forest canopy (e.g., eastern hemlock, eastern white pine, and minor components of white spruce, balsam fir, and northern white cedar on some sites).
- Fragmentation can be an issue in some parts of the state.
- Unsustainable forest practices and harvest during improper seasons can result in soil compaction and sedimentation into aquatic systems and wetlands.
- Invasives (e.g., garlic mustard) are a problem in some places.
- High deer populations are causing damage to some herbs and inhibiting establishment of conifers such as hemlock, northern white cedar, and Canada yew.
- Simplification is taking place, with sugar maple increasing at the expense of other tree species. The lack of windthrow gaps may contribute to simplification. Specialized ground flora (e.g., lilies, orchids, insect-pollinated species) are decreasing in abundance, while generalist species and non-natives are increasing.
- Exotic earthworms can change edaphic properties, especially in the organic soil horizons, and impact understory vegetation and soil invertebrate composition (Casson et al. 2002).
- Motorized recreation and high road densities contribute to soil loss and sedimentation, and facilitate the spread of invasive plants.

Priority Conservation Actions

- Maintain large forest blocks for this type where possible.
- Increase connectivity where feasible.
- Work toward a balanced mosaic of age-classes; older age classes are currently underrepresented. Intensively managed industrial and county forests can provide early successional habitats in some Ecological Landscapes.
- Increase species diversity. Use adaptive management techniques (non-standard silvicultural techniques found to be successful in field trials) to restore structure and composition. Monitor and share results.
- Encourage regeneration or reestablishment of eastern hemlock, other conifers, yellow birch, and Canada yew where appropriate through adaptive management techniques.
- Lower deer numbers, if possible.
- Monitor and control invasives. Continue to support research designed to identify effective biological controls for invasive species. Use management techniques that limit spread of additional invasives.
- Use Best Management Practices and other sustainable forest community management practices to prevent detrimental soil and water effects.
- Areas that currently have a low potential for exotic earthworm invasion should be managed to minimize the likelihood of invasion by preventing transport of worms, eggs, and cocoons in soils through movement of soils in potted plants, soil packed on heavy equipment and off-road vehicles or their tires, soil packed on livestock hooves, or transport of worms as fishing bait. Additional research is needed to evaluate potential mechanisms for long-term control of exotic earthworms (Casson et al. 2002).

- Manage recreational uses so they are compatible with protecting the environment (e.g., limiting erosion, controlling spread of invasives, preventing damage to sensitive soils and vegetation).

3.3.5.5.3.2 Additional Considerations for Northern Mesic Forest by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of northern wet-mesic forest exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for northern mesic forest found in Section 3.3.5.5.3.1.

Additional Considerations for Northern Mesic Forest in Ecological Landscapes with Major Opportunities for Protection, Restoration, and/or Management of Northern Mesic Forest

Forest Transition

Fragmentation is a major issue in this Ecological Landscape due to the past conversion of forest to agricultural uses. Upland forest is now typically found in a matrix of farmland, except for the eastern portion of this Ecological Landscape that includes portions of the Menominee Reservation and Chequamegon-Nicolet National Forests. This Ecological Landscape has little public land, so residential development is further fragmenting and simplifying this community type. In addition, the lack of public land hinders protection, restoration, and/or management at any scale. Grazing in this forest type can create problems by eliminating some plant species and reducing forest regeneration. Invasives such as buckthorn are a serious problem.

The eastern edge of this Ecological Landscape contains some of the most significant examples of extensive older forest in the state, primarily on the Menominee Indian Reservation and to a lesser degree on the Chequamegon-Nicolet National Forest. South Branch Beech Grove in Oconto County is an occurrence found in the Chequamegon-Nicolet National Forest, and the Dalles of the Eau Claire River County Park (Marathon County) is another example. Eastern hemlock should be preserved within this Ecological Landscape; the western portion of the Ecological Landscape includes the edge of eastern hemlock's range. Rib Mountain State Park has potential for developing scarce older forest in a part of the Ecological Landscape with little public land. Deer density in Rib Mountain State Park should be reduced to allow forest regeneration. Older forests in this Ecological Landscape are desirable, especially if they are contained in or linked with large blocks of forest.

North Central Forest

Although fragmentation is a concern in some parts of this Ecological Landscape, especially in areas where residential development and road construction is currently expanding, it still provides the best opportunities for maintaining large blocks of northern mesic forest. There are also opportunities to implement other conservation actions (e.g., encourage species and structural diversity, achieve balanced age-class distributions) because of the abundance of the type and the large public ownership. Important existing sites include the Bose Lake Hemlock-Hardwood State Natural Area, Anvil Lake Hardwoods, and Moose Lake State Natural Area; the Doering Tract on the Chequamegon-Nicolet National Forest; and Catherine Lake, a proposed State Natural Area on the Northern Highland-American Legion State Forest. Efforts should be made to maintain or enhance connectivity among large forested areas, including the National Forests and the Northern Highland-American Legion State Forest, and create linkages with the Ottawa National Forest in Michigan.

Northern Lake Michigan Coastal

Fragmentation is a serious issue in this Ecological Landscape. Invasives are also a serious problem (e.g., garlic mustard is established in many locations) and grazing occurs in some areas (e.g., Door County). Very high recreational use in Door County is a factor in many kinds of impacts, including trail development that leads to spread of invasives, and fragmentation due to housing and roads. The level of deer herbivory is extremely high, partly because hunting access is restricted in many areas, and deer population levels are well over goal.

The northern mesic forest community type was once widespread here, but the Ecological Landscape is now 63% non-forested. Meridian County Park, Whitefish Dunes State Park, and Rock Island State Park contain examples of the community type in this Ecological Landscape. There are a few larger blocks of second-growth forest that have not been thoroughly evaluated (mostly on the west side of Green Bay on Lake Michigan). Older aged forests are present, primarily on the Door Peninsula, but are scarce west of Green Bay. Additional areas of older forest are desirable, especially stands with white pine and/or hemlock components.

Additional Considerations for Northern Mesic Forest in Ecological Landscapes with Important Opportunities for Protection, Restoration, and/or Management of Northern Mesic Forest

Central Lake Michigan Coastal

Point Beach supports a small area of this type on stabilized dunes. Upland islands within the floodplain of the Wolf River also support this type. Eastern hemlock is at its southern range limit here, and American beech is at its western range limit. Fragmentation is a major issue in this Ecological Landscape since upland forest is only 7% of the landscape within a matrix of agriculture. Residential development is further fragmenting and simplifying this community type. Invasives such as Asian honeysuckles and buckthorns are a problem. Emerald ash borer may become a threat to ash trees in the Ecological Landscape. Grazing can be a problem affecting regeneration, destruction of understory plants, and the spread of invasives.

There are limited opportunities, but additional high quality sites should be protected where they exist. Grazing on forested lands should be discouraged.

Central Sand Plains

Northern mesic forest is extremely limited in this Ecological Landscape, but there are patches of older forest with conifers at the southern edge of their range limits. Patch sizes are small; most are farm woodlots. Fragmentation is a major issue for these sites. Invasives such as garlic mustard and buckthorns are a problem.

The high-quality remaining site of this community type on Big Island near Wisconsin Rapids in the Wisconsin River should be protected.

Northeast Sands

Fragmentation is less of an issue in northern mesic forests of this Ecological Landscape. However, this community type is concentrated in the southwest portion of the Ecological Landscape and is not widespread. Older forests occur on the Menominee Reservation; additional areas on other lands are desirable, especially stands with a conifer component.

Northern Highland

Fragmentation is also less of an issue in this Ecological Landscape. The Northern Highland Ecological Landscape has a high degree of natural heterogeneity, including complexes of different forest types, wetlands and lakes. Natural ecotones are an important feature. The northern mesic forest community type is not widespread within the Ecological Landscape, but older age-classes are present, including stands with eastern hemlock and eastern white pine components, which should be protected. Overall, stands of this community type should be protected and surrounding lands should be managed compatibly. Examples of the community type are present on the Northern Highland-American Legion State Forest.

Invasives such as non-native honeysuckles, buckthorns, and garlic mustard have the potential to become a problem and should be monitored.

Northwest Lowlands

Fragmentation is less of an issue in this Ecological Landscape, in part because road density is the lowest, on average, of all the Ecological Landscapes, which is important for some large mammals (e.g., gray wolf).

This Ecological Landscape has a high degree of natural heterogeneity, including complexes of different forest types and wetlands. Upland-to-wetland natural ecotones are an important feature. Connectivity should be increased where needed and feasible. Older forests are scarce in this Ecological Landscape and should be increased, especially stands with a conifer component. Opportunities to re-establish conifers where they are absent or scarce should be identified. Eastern hemlock should be maintained where it occurs at the eastern edge of the Ecological Landscape. County forests currently provide adequate amounts of early successional habitat. If possible, deer numbers should be lowered to goal. Invasives are not a large problem at present, but should be monitored.

Superior Coastal Plain

In this Ecological Landscape, this type is well-developed only on the Apostle Islands and in the northern and eastern portion of the Bayfield Peninsula. Much of this type converted to aspen following the Cutover. Old forest is lacking in some locations on the northern Bayfield Peninsula. Japanese knotweed is becoming a problem throughout the mainland portion of the Ecological Landscape, and buckthorns are locally established and likely to spread. The high deer population is causing damage to vegetation at some locations (e.g., Madeline Island, mainland). Canada yew is threatened on the mainland.

Old growth forest that occurs on some former lighthouse reservations, now part of the National Lakeshore, should be protected. Canada yew and other browse-sensitive species are abundant on some of the Apostle Islands where deer populations are low. Opportunities to re-establish conifers where they are absent or scarce should be sought. Eastern hemlock, northern white cedar, and yellow birch should be maintained and restored where appropriate. Opportunities to protect or restore older forests on the mainland should be identified. Higher terraces that do not frequently flood have rich mesic hardwood forests with high plant diversity and species occurrences uncommon this far north; some are in or approaching old-growth status (e.g., Nemadji and Bad Rivers). County forests currently provide adequate amounts of early successional habitat. Recovery of conifers in stands damaged by fire and heavy Cutover era logging on the islands should be monitored and studied. Deer numbers should be reduced to goal, if possible. Recreational uses should be limited to control damage to sensitive, highly erodible soils.